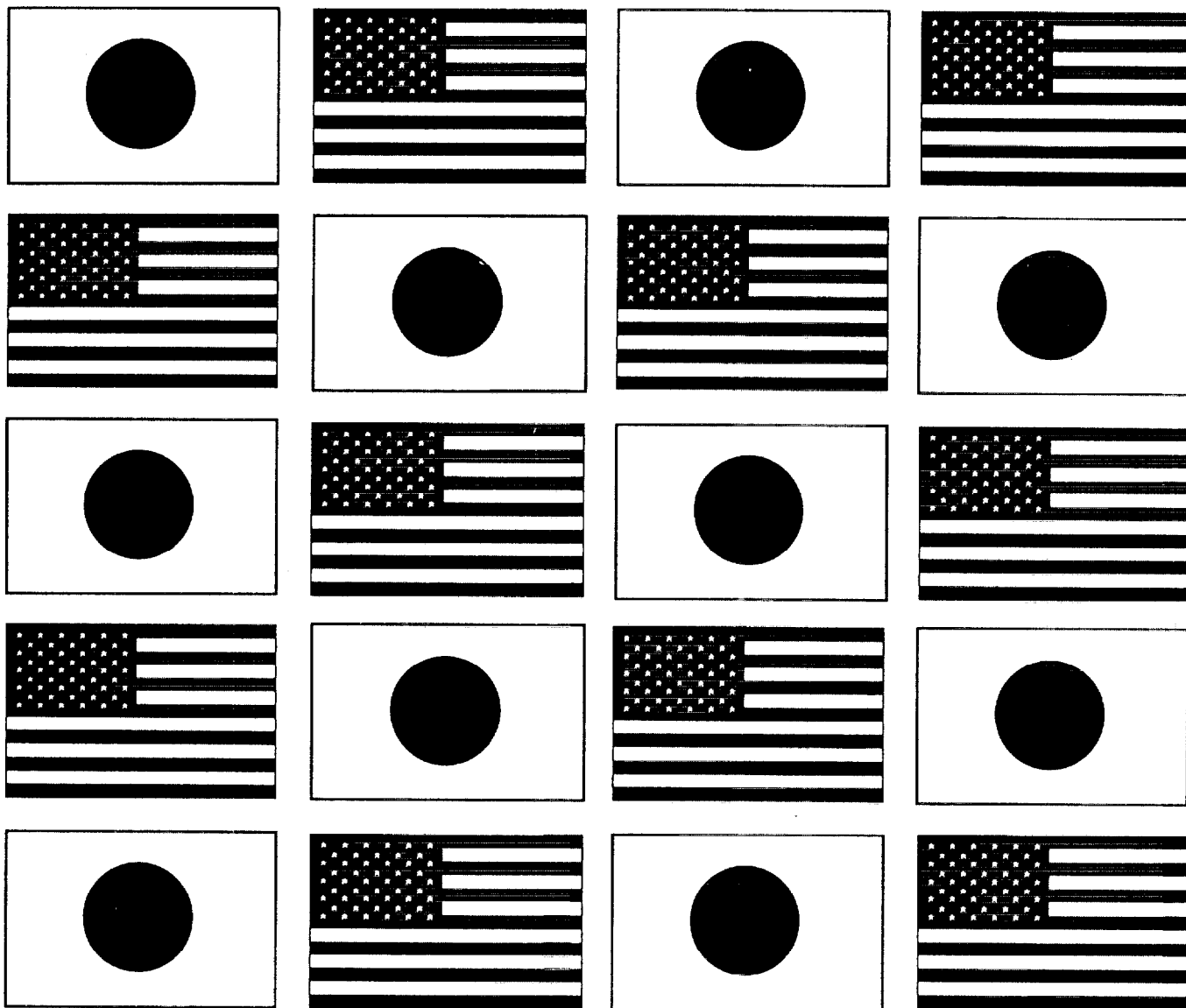


Wind and Seismic Effects

Proceedings of the 30th Joint Meeting

NIST SP 931



U.S. DEPARTMENT OF COMMERCE
Technology Administration
National Institute of Standards and Technology

Wind and Seismic Effects

NIST SP 931

**PROCEEDINGS OF
THE 30TH JOINT
MEETING OF
THE U.S.-JAPAN
COOPERATIVE PROGRAM
IN NATURAL RESOURCES
PANEL ON WIND AND
SEISMIC EFFECTS**

Issued August 1998

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APPENDIX

TASK COMMITTEE A-K REPORTS AND NEW T/C ON SEISMIC INFORMATION SYSTEMS

REPORT OF TASK COMMITTEE A

STRONG MOTION DATA AND APPLICATIONS

Date: 12 May 1998

Place: National Institute of Standards and Technology, Gaithersburg, Maryland

Attendees:	Japan side --	Susumu Iai (Chairman)	PHRI
		Kazushige Endo	PWRI
	U. S. side --	Roger D. Borchardt (Chairman)	USGS
		Jon Ake	USBR
		Michael Blackford	NOAA
		William B. Joyner	USGS

1. Objective and Scope of Work

To coordinate and promote sharing of strong motion earthquake data among researchers and practicing engineers, and to develop techniques and exchange information for evaluating the destructive effects of earthquake motion.

The scope of work includes:

1. instrumentation,
2. recording, processing, and analyzing strong motion data,
3. engineering characterization of ground motion,
4. design applications, and
5. seismic zonation.

The activities of the Task Committee include:

1. regular exchange of data and publications,
2. creating procedures for disseminating significant strong motion digital data with regard for the rights and expectations of (a) owner(s), (b) data users and (c) the earthquake engineering community,
3. planning and conducting T/C workshops and meetings, and
4. coordinating relevant research activities.

2. Accomplishments

The 1994 Northridge and the 1995 Hanshin-Awaji earthquakes had a tremendous impact on various aspects of strong motion studies, including characterization of near field motion and site response. Research developments since these earthquakes have been very rapid, including proposals for new seismic guidelines, recommendations and codes in both the U.S. and Japan as well as a new proposal of a worldwide seismic hazard map for use in specifying seismic guidelines for offshore structures by the International Standards Organization (ISO). All these developments happened since 1995 and more are coming in 1998. In view of these developments, Task Committee A accomplished:

1. Closely monitored and contributed to seismic guidelines and codes in both countries, including UBC97 and NEHRP97 in the U.S. and ISO/WG67 in Japan,
2. At the suggestion of the Task Committee A members, a call for cooperation between U. S. and Japan in strong motion studies was included in the Earthquake Policy Symposium of the Common Agenda,
3. K-Net was completed with the effort of Task Committee A members. Rapidly accessible data standards established by K-Net are a model that should be followed by other U. S. and Japan strong motion programs during future development. Recently, the second CD-ROM with K-Net strong-motion data has been released in both Japanese and English,
4. Chairmen and members of Task Committee A contributed in January 1998 to a widely attended workshop sponsored by the Southern California Earthquake Center on the important subject of "Nonlinear Soil Response".

Tragic losses from the 1994 Northridge earthquake and the 1995 Hanshin-Awaji earthquake have emphasized the urgent need to mitigate the effects of future earthquakes during the next millennium. Recent efforts in the United States emphasize that inadequate sets of strong-motion recordings are presently a major obstacle to earthquake hazard mitigation. Towards developing a vision for strong-motion recording in the next millennium, Task Committee A members have contributed to several recent accomplishments. These include:

1. Participating on the Committee for the Advancement of Strong Motion Programs (CASMP) by US members,
2. Contributing to the organization and proceedings of the international workshop entitled "Vision 2005: An Action Plan for Strong-Motion Programs to Mitigate Earthquake Losses in Urbanized Areas", Monterey, CA, April 1997,
3. Contributing to the development and organization of the Consortium of Organizations for Strong-Motion Observation Systems (COSMOS),
4. Developing an initiative in the U.S. to instrument Federally owned and leased buildings with endorsement provided by CASMP and appropriate committees of the Interagency Committee for Seismic Safety in Construction (ICSSC).

3. Future Plans

Future plans include:

1. Planning a Task Committee workshop on Soil-structure Interaction (Chairmen: Celebi and Okawa, September 1998 in U. S.).
2. Hosting a new workshop in December 1998 on strong motion studies, which could be held in conjunction with ESG 98 (Effect of Surface Geology), to review and integrate, where possible, the most recent developments since the 1996 workshop.
3. Coordinating, where appropriate, ongoing U.S. and Japan developments in strong-motion-recording and data-dissemination programs, in conjunction with activities of recently established committees such as CASMP and organizations such as COSMOS.
4. Develop recommendations for Common Agenda, possibly in a workshop, regarding U.S. and Japan needs for strong-motion measurement in densely urbanized areas to significantly improve public earthquake safety.
5. Coordinating, where appropriate, ongoing developments in seismic hazard mapping and seismic codes for generalization and worldwide use.
6. Recognizing the developing emphasis in the engineering and emergency response communities on near-real time data availability, TC/A will continue to promote and exchange new developments in real-time data acquisition, processing, and notification. This activity will be in conjunction with the proposed TC on Seismic Information Systems.
7. Pursuing the idea of establishing a WWW page, which provides links to home pages of participating strong-motion organizations in conjunction with other UJNR WWW activities.

REPORT OF TASK COMMITTEE B

TESTING AND EVALUATION PROCEDURES FOR BUILDING SYSTEMS

Date: 12 May 1998

Place: National Institute of Standards and Technology, Gaithersburg, MD, U.S.A

Attendees: U. S. Side -- H. S. Lew (Chairman) NIST
Daniel Abrams MAE Center

Japan Side -- Keiichi Ohtani (Chairman) NIED
Makoto Watabe Keio University

1. Objective and Scope of Work

The objective of the Task Committee is to develop and recommend rational test procedures and to collect performance data of dynamic response of structures through both laboratory testing of prototype structures and field testing of structures in-situ.

The scope of work includes:

1. Plans and conducts workshops and joint meetings to identify research topics and develops joint research programs.
2. Coordinates research projects carried out by various laboratories in the U. S. and Japan. Facilitates publication of research results and implementation of findings in codes and standards.
3. Facilitates exchange of research personnel, technical information and available testing facilities.
4. Develops uniform testing procedures including test loading history for case of comparison of results of tests carried out by various researchers, and for establishment of data base.
5. Develops guidelines for interpretation of test results in consideration for design of structures.
6. Develops methodology for evaluation and interpretation of physical test results.

2. Accomplishments

1. The third phase of the U. S. Precast Seismic Structural Systems Program (PRESSS) was initiated in 1995. Studies, including the testing of a full scale, five story frame

structure are in progress. Large-scale frame testing will be carried out at the University of California – San Diego.

2. In Japan, a 3-year program on the development of design guidelines for precast/prestressed buildings has been underway for the past two years and will be completed in 1998.
3. The research program on Composite and Hybrid Structures (CHS) in Japan was completed in early 1998. Experimental and analytical work was carried out jointly. The Building Research Institute, several universities and construction companies, and the Japan Structural Consultant Association undertook an applications study for implementing research results into practice.
4. The research program on CHS in the U.S. was initiated in 1995 under the sponsorship of the National Science Foundation. Over 16 research projects are in progress. Additional projects on composite wall systems are being initiated.
5. The Fourth U.S.-Japan Joint Technical Coordinating Committee (JTCC) meeting on CHS was held in October 1997 in Monterey, CA. Both sides agreed to continue to coordinate efforts in the development of design guidelines and to transfer technology to the design profession.
6. The 6th U.S.-Japan Cooperative Research on "Smart Structural Systems" (Auto-Adaptive Media) was initiated in 1998.

3. Future Plans

1. The Fifth U.S.-Japan Joint Technical Coordinating Committee Meeting on CHS will be held in October 1998 in Japan, in conjunction with an International Symposium to commemorate the 20th Anniversary of U.S.-Japan Cooperative Research.
2. Several TCC meetings will be scheduled in respective countries in the coming year.
3. In support of the International Decade for Natural Disaster Reduction (IDNDR) Program, techniques will be explored to disseminate findings of completed joint research projects to countries with high seismic risks.
4. A joint workshop on Test Procedure, Documentation, Retrieval of Test Data, and Experimental Facilities will be held to maximize the usefulness of research data. The date and location will be established prior to the 31st Joint Panel Meeting.
5. Future plans for U.S.-Japan cooperative programs shall consider existing and planned experimental research programs of the three new NSF earthquake engineering research centers.

REPORT OF TASK COMMITTEE C
DESIGN, EVALUATION AND IMPROVEMENT OF STRUCTURES

Date: 12 May 1998

Place: National Institute of Standards and Technology, Gaithersburg, MD, USA

Attendees:	U.S.-side--	Shi-Chi Liu (Acting Chairman)	NSF
		Noel Raufaste	NIST
		Lawrence Hultengren	DOS
	Japan-side--	Hisahiro Hiraishi (Chairman)	BRI
		Jun-ichi Hoshikuma	PWRI
		Michio Okahara	PWRI
		Takao Masui	NLA
		Akiyoshi Mukai	BRI

1. Objective and Scope of Work

The objective of Task Committee (C) is to develop disaster mitigation guidelines and programs that will improve the performance of new structures and the capacity of existing structures in resisting wind and seismic forces. To establish adequate evaluation of performance, each country will coordinate the development of condition assessment, screening, structural analysis, and design methodologies. Enhance performance can be obtained by the intelligent renewal, repair, and retrofit of existing buildings and other structures. Certain structures will be analyzed and instrumented and then evaluated after disasters. Also, effective use of new advanced materials, smart materials, and structural systems associated with appropriate design methods, will provide structural performance in the life cycle.

The scope of work includes:

1. Exchanging information, planning and hosting workshops on new design technologies, evaluation technologies, and repair and retrofit techniques.
2. Studying new materials and methods for repairing and retrofitting existing structures and for new construction.
3. Developing a uniform system for screening and analyzing wind and seismic resistance capacity of structures in each country.
4. Evaluating, composite/hybrid building structures and smart structural systems and providing documentation for post-disaster evaluation of performance.
5. Developing reliable condition assessment systems for new and existing structures.

6. Coordinating research projects in the U.S. and Japan to minimize duplication and maximize benefits.

2. Accomplishments

1. Conducted the fourth U.S.-Japan Technical Coordinating Committee Meeting on Composite and Hybrid Structural Systems, Monterey, CA, USA, during 12-14 October 1997.
2. In the field of hybrid structural systems, Dr. H. Kuramoto, BRI, completed a one-year (October 1996-September 1997) research assignment at Cornell University, and Prof. R. Frosh, Purdue University, visited BRI in March 1998 to discuss the 6th U.S.-Japan Cooperative Research Program on Smart Structural Systems.
3. Initiated Phase 6 of the U.S.-Japan Cooperative Research Program on "Auto-Adaptive Media (Smart Structural Systems).

3. Future Plans

The following activities are planned for T/C (C):

1. Conduct the 5th U.S.-Japan Technical Coordinating Committee Meeting on Composite and Hybrid Structural Systems, October 1998, Japan.
2. Conduct Workshops on Auto-Adaptive Media (Smart Structural Systems), in May at Sonoma, CA, and Fall (to be determined), USA, 1998.
3. Conduct a 20-year commemoration symposium on Cooperative Earthquake Engineering Research, October 1998, Tokyo.
4. Continue the 6th U.S.-Japan Cooperative Research Project on Auto-Adaptive Media (Smart Structural Systems).
5. Develop a reliable methodology for screening and analyzing wind and seismic resistant capacity, and advanced instrumentation technology and expert systems to provide condition assessment of existing structures.
6. Compile a database of advance materials/systems that have potential for improving structural performance of new construction, and for use in rehabilitating and strengthening existing buildings.
7. Investigate new design methodologies based on required structural performance using advanced materials and systems.

8. Continue to encourage participants by private industry, consulting engineers, universities, national and local government agencies involved in instrumentation, evaluation, condition assessment, and retrofit and strengthening of existing buildings, for seismic and wind resistance.

4. Other Activities

The following activities support the work of T/C (C):

1. U.S. research sponsored by NSF, Corps of Engineers, NIST and FHWA have developed reports on seismic rehabilitation and retrofit strategies, including innovative techniques for strengthening existing buildings and bridges.
2. Continue development of NSF's Civil Infrastructure Systems Research Program, including strong emphasis on evaluation and improvement of structures.
3. Continue to encourage conduct of research in the area of retrofit and repair of buildings and structures.

5. Develop and Harmonize T/Cs C & G

The consolidation of the T/Cs (C&G) was proposed at the U.S.-side Domestic Panel Meeting of September 1997 and was approved by both sides at their respective Domestic Panel Meetings, December 1997. T/C (C) requests approval from the full Panel at the 30th Joint Panel Meeting of May 1998 to consolidate T/Cs (C&G) into a new T/C (C). The revised name and proposed mission will be proposed by the respective T/C Chairs at both sides Fall 1998 Domestic Meetings. Suggested new T/C titles were:

1. High Performance Structural Systems and Auto-Adaptive Media.
2. High Performance Systems: Design, Repair, Evaluation, and Auto-Adaptive Media.

Suggested objective and scope of work and the future plans of the renewal Task Committee (C) are as follows:

1. Exchange information, and plan and conduct workshops on new design technologies, evaluation technologies, repair and retrofit techniques.
2. Study advanced materials and methods for new construction and for repairing and retrofitting existing structures.
3. Develop reliable condition assessment systems for new, existing and damaged structures.
4. Develop and Harmonize performance based structural design developed in each country.

5. **Coordinate research projects on design, evaluation and improvement of structures in the U.S. and Japan to minimize duplication and maximize benefits.**

REPORT OF TASK COMMITTEE D

EARTHQUAKE ENGINEERING FOR DAMS

Date: 12 May 1998

Place: National Institute of Standards and Technology, Gaithersburg, MD, USA

Attendees:	U.S.-side--	Robert Hall (Chairman)	USAE
		Joseph Koester	USAE
		William Roper	USAE
		Larry Nuss	USBR
		Frank McLean	USBR
	Japan-side--	Takashi Sasaki (Acting-Chairman)	PWRI
		Mitsu Okamura	PWRI
		Hideki Sugita	PWRI

1. Objective and Scope of Work

To develop technical insights into better understanding of the response of dams to seismic effects, the T/C will plan, promote, and develop research initiatives to assist in assuring seismic safety and economical protective countermeasure against earthquake loading for these structures.

The scope of work includes:

1. Methods of analysis for seismic design of dams including outlet works. Comparison of design methods and criteria between U.S. and Japan. Development of "Design Earthquake Ground Motions" for analysis and evaluation of dams. Assessment of investigation and dynamic analysis methods as tools (modeling, calculation codes).
2. Dynamic characteristics of dam construction materials and site conditions. Strength and deformation characteristics during earthquakes (concrete, soil and rock).
3. Analysis of observed behavior of dams and outlet works during earthquakes. Investigation of the mechanism of damages due to earthquake loading. Application of the analysis of the observed behavior during earthquake to the earthquake-resistant design.

2. Accomplishments

1. T/C (D) conducted the First U.S.-Japan Workshop on Advanced Research on Earthquake Engineering for Dams at the Waterways Experiment Station in Vicksburg, Mississippi, USA, on 12-14 November, 1996.
2. Articles related to the first Workshop were printed in the Panel's Technical Bulletin *Winds and Seismic Effects*, Issue 4, and in the PWRI Newsletter, No. 68.
3. In the field of seismic design for concrete dams, Mr. Takashi Sasaki, PWRI, started a one-year (December 1997-December 1998) research at University of California, Berkeley.
4. Some members of T/C (D) of U.S. and Japan sides participated in the 4th International Conference on Case Histories in Geomechanical Engineering in St. Louis, Missouri, USA on 9-12 March 1998, and exchanged the latest results of research/investigation and the newest technical information about dam earthquake engineering.

3. Future Plans

1. Exchange of the results of research/investigation and technical information about dam earthquake engineering is encouraged, and feasibility of joint research and investigation is in continuous consideration.
2. Exchange visits to the institutes concerned, of scientists and engineers between U.S. and Japan, is to be extended for the effective communications.
3. The proceedings of the first Workshop will be published and distributed to the T/C members and Panel Secretariats.
4. In the field of seismic design for embankment dams, Mr. Tomoya Iwashita, PWRI, will start a one-year (August 1998-August 1999) research at University of California, Berkeley.
5. T/C (D) will hold the Second Workshop at the Public Works Research Institute, Tsukuba, Japan, or at another location in Japan that would enhance field observation opportunities in conjunction with the 31st Joint Panel Meeting in 1999.
6. Update the Task Committee membership.

REPORT OF TASK COMMITTEE E

DESIGN FOR WIND AND WIND HAZARD MITIGATION

Date: 12 May 1998

Place: National Institute of Standards and Technology, Gaithersburg, MD, USA

Attendees:	U.S.-side --	Joseph Golden (Chairman)	NOAA
		Bogusz Bienkiewicz	CSU/FHWA
		Art Chiu	University of Hawaii at Manoa
		Harold Bosch	FHWA
	Japan-side --	Hiroshi Sato (Co-Chairman)	PWRI
		Shigetoshi Kobayashi	PWRC

1. Objective and Scope of Work

To exchange technical information and to jointly plan, promote and foster research and dissemination, to improve understanding of wind and its effects on structures, establish more rational wind resistant design methods for structures, and to contribute to wind hazard mitigation.

The scope of work includes:

1. Characterization of strong wind, especially boundary layer extreme winds.
2. Wind effects (wind loading on and wind-induced response of structures).
3. Experimental and analytical methods to predict wind and its effects.
4. Damage and risk assessment.
5. Wind hazard assessments and wind hazard mitigation.

2. Accomplishments

Held the first joint Workshop on Design for Wind and Wind hazard Mitigation at the East-West Center at the University of Hawaii on October 7-9, 1997. Seven Japan-side members and ten U.S.-side members participated in the Workshop. After presenting recent research results, the participants discussed potential research topics that could be pursued in a collaborative program. Many of the participants visited the NOAA Tsunami Warning Center and the National Weather Service Office on Oahu; and some also visited the NOAA Mauna Loa Observatory on Hawaii following the Workshop. The proceedings of the Workshop will be published by the U.S.-side, and distributed to all the Task Committee members.

3. Future Plans

1. Hold the second joint workshop in Japan in the autumn of 1998, possibly November.
2. Pursue the possibility of collaborative research on the topics recommended at the first workshop. PWRI and the University of Washington are discussing possible collaborative research on "Development of Prediction Methods for Wind Response of Long Span Bridges."
3. Exchange technical information on the following subjects:
 - a) Topographical effects on wind and the use of field measurements, numerical models and geographic information systems (GIS) to study these effects.
 - b) Control of wind-induced response of structures.
 - c) Computational fluid dynamics and wind tunnel tests.
 - d) Prediction of wind-induced response of full-scale structures.
 - e) Investigation of wind hazards, including post-storm damage assessment methodologies.
 - f) Wind resistant design codes, standards and recommendations.

REPORT OF TASK COMMITTEE F DISASTER PREVENTION METHODS FOR LIFELINE SYSTEMS

Date : 12 May 1998

Place : National Institute of Standards and Technology, Gaithersburg, MD, USA

Attendees :	U.S.-side –	Riley Chung (Chairman)	NIST
		Ronald Andrus	NIST
		Josephine Malilay	CDC
		Phillip Yen	FHWA
	Japan-side –	Keiichi Tamura (Acting-Chairman)	PWRI
		Takaharu Kiriyaama	NLA
		Keiko Ogawa	Tohoku University

1. Objectives and Scope of Work

To improve the performance of lifeline systems during earthquakes and extreme winds, and to promote the development and implementation of technical and non-technical countermeasures, including the capability in damage estimation techniques and inspection procedures, through:

1. Planning and conducting workshops.
2. Facilitating exchange of technical information and personnel.
3. Promoting development of design guidelines and standards.

2. Accomplishments

1. Members of this T/C participated in the planning of the second earthquake policy symposium held in Kobe, Japan in September 1997. The symposium was led by the U.S. Federal Emergency Management Agency and the National Land Agency of Japan, under the U.S.-Japan Natural Disaster Reduction Initiative of the U.S.-Japan Framework for New Economic Partnership (Common Agenda).
2. Task Committee (F) held the Seventh Joint Workshop on Disaster Prevention for Lifeline Systems on November 4 through 7, 1997, in Seattle, Washington. The workshop was co-sponsored by the Public Works Research Institute of Japan and the National Science Foundation and the National Institute of Standards and Technology of the United States. Forty-five experts, representing government, academia, industry and private practice, participated in the workshop. Thirty papers were presented, many of them focused on the results of the studies of the two most recent devastating earthquakes; the 1994 Northridge earthquake in California and the 1995 Kobe earthquake in Japan.
3. Under the auspices of Task Committees (F&H), Dr. Ronald D. Andrus, an NIST researcher in geotechnical earthquake engineering, had a successful visit in December 1997 to PWRI, PHRI, and other

universities and private companies. The purpose of his visit was to collect additional information on shear wave velocities at sites where liquefaction has happened or not happened during past earthquakes in Japan and to explore the use of shear wave velocities for evaluating liquefaction potential for lifeline systems.

3. Future Plans

1. Encourage collaborative research and development in areas such as: performance prediction and post-earthquake damage assessment of lifeline systems; systems approach to lifeline performance; soil-structure interaction; and cost-effective ground improvement techniques and other countermeasures for lifeline facilities.
2. Encourage and strengthen current efforts in both countries for developing seismic design guidelines and standards for lifeline systems. Existing UJNR channels should be fully utilized to facilitate the exchange of relevant information concerning the development of guidelines and standards. Possible collaboration of developing guidelines and standards for lifeline systems should be pursued.
3. Initiate cooperative efforts, including development of a database, between lifeline engineering and public health to assess consequences due to the disruption of lifeline systems.
4. Hold the Eighth Joint Workshop on Disaster Prevention for Lifeline Systems in the Fall of 1999 in Japan. Specific location, time, and theme of the workshop will be determined through correspondence between the co-chairs of this task committee.

REPORT OF TASK COMMITTEE G
STRUCTURAL CONTROL AND INTELLIGENT MATERIAL SYSTEMS

Date: 12 May 1998

Place: National Institute of Standards and Technology, Gaithersburg, MD, USA

Attendees:	U.S.-side –	Shi-Chi Liu (Chairman)	NSF
		Noel Raufaste	NIST
		Lawrence Hultengren	DOS
	Japan-side –	Jun-ichi Hoshikuma (Acting-Chairman)	PWRI
		Hisahiro Hiraishi	BRI
		Michio Okahara	PWRI
		Takao Masui	NLA
		Akiyoshi Mukai	BRI

1. Objective and Scope of Work

1. Develop research plans in control of equipment and structures and in high performance structural and material systems;
2. Implement control techniques for motion reduction and modification;
3. Implement use of advanced materials in actual design and construction of buildings and other infrastructure systems under seismic or wind environments;
4. Promote U.S.-Japan cooperation in structural control and intelligent material systems research;
5. Bring together governmental, academic, and industrial participants in joint pursuit of these efforts; and
6. Contribute to IDNDR by organizing joint research and other technical activities in structural and intelligent material systems research based on international cooperation.

T/C (G) works closely with other organizations to provide the leadership in this emerging research by facilitating the exchange of data and information through UJNR mechanisms. The scope of work includes:

1. Providing technical assistance, consultation and coordination of UJNR affiliated research organization in the initiation, development, and execute their programs in research areas.
2. Promoting joint government-university-industry collaborative efforts to facilitate technology transfer and practical implementation.

3. Sponsoring and conducting interdisciplinary workshops and meetings to identify key area of research and opportunities for cooperation, and to stimulate public awareness and interest in this field of research.
4. Developing promotional and demonstrative activities to stimulate public awareness and interest in this field of research.
5. Providing information useful for the establishment of performance standards, design and also retrofit/rehabilitation of existing structures.
6. Promoting research in intelligent material systems, sensors, actuators, optional control system design, and encourage laboratory and field experiments of prototype and full-scale structures.

2. Accomplishments

1. In 1998, a five-year U.S.-Japan Cooperative Research Program on Urban Earthquake Disaster Mitigation between NSF and Monbusho (Ministry of Education) was initiated under U.S.-Japan Common Agenda.
2. Phase 6 of the U.S.-Japan Cooperative Research Program on "Auto-Adaptive Media" (Smart Structural Systems) was initiated in 1998.

3. Future Plans

1. To implement Phase 6 of the above U.S.-Japan Cooperative Research Program on Auto-Adaptive Media.
2. Task Committee (G) confirmed its agreement to consolidate with T/C (C) into a new T/C (C). The activities of T/C (G) will be continued in the new T/C (C) and in T/C (J).

4. Develop and Harmonize T/Cs C&G

The consolidation of the T/Cs (C&G) was proposed at the U.S.-side Domestic Panel Meeting of September 1997, and was approved by both sides at their respective Domestic Panel Meetings, December 1997. T/C (G) requests approval, from the full Panel at the 30th Joint Panel Meeting of May 1998, to consolidate T/Cs (C&G) into a new T/C (C). The revised name and proposed mission will be proposed by the respective T/C Chairs at both sides' Fall 1998 Domestic Meetings. Suggested new T/C titles were:

1. High Performance Structural Systems and Auto-Adaptive Media
2. High Performance Systems: Design, Repair, Evaluation, and Adaptive Media.

Suggested objective and scope of work and the future plans of the consolidated T/C (C) are as follows:

1. Exchange information, and plan and conduct workshops on new design technologies, evaluation technologies, repair and retrofit techniques.

2. Study advanced materials and methods for new construction and for repairing and retrofitting existing structures.
3. Develop reliable condition assessment systems for new, existing and damaged structures.
4. Develop and Harmonize performance based structural design developed in each country.
5. Coordinate research projects on design, evaluation, and improvement of structures in the U.S. and Japan to minimize duplication and maximize benefits.

REPORT OF TASK COMMITTEE H
SOIL BEHAVIOR AND STABILITY DURING EARTHQUAKES

Date: 13 May 1998

Place: National Institute of Standards and Technology, Gaithersburg, MD, USA

Attendees: U.S.-side – Joseph P. Koester (Acting-Chairman) WES
Jon Ake USBR
Larry Nuss USBR
Ronald Andrus NIST
Frank McLean USBR
William Joyner USGS

Japan-side – Mitsu Okamura (Acting-Chairman) PWRI
Takashi Sasaki PWRI

1. Objective and Scope of Work

Government agencies responsible for public works must assure seismic safety and provide economical protection against earthquake hazards.

The objective of the Task Committee (H) is to assist in meeting these needs by enhancing the availability of technology for predicting the dynamic behavior of soils, foundations and earth structures, and analyzing dynamic soil/structure interaction to assure their safe performance during earthquakes.

In accordance with the objective, the scope of work includes:

1. Exchange information on technological developments, state-of-the-art and practice related to soil behavior and stability during earthquakes.
2. Exchange information and technical data relating to field performance, research, and methods of practice.
3. Plan and conduct programs of cooperative research and/or workshops in coordination with the proposed or on-going programs.
4. Make other efforts needed including exchange of researchers between U.S. and Japanese research institutions, and publication of research results and recommended practice.

2. Accomplishments

1. The National Research Institute for Earth Science and Disaster Prevention (NIED), the Building Research Institute (BRI), and Wayne State University (WSU), have continued to work in their cooperative research program "Physical and Numerical Simulation of Structural Damages Due to Liquefaction and Development of Countermeasure Techniques," 1994-1998.
2. Port and Harbor Research Institute (PHRI), Colorado School of Mines and the Lovelace Institutes (Albuquerque, NM) have continued joint research on application of the Nuclear Magnetic Resonance Imaging (NMRI) method to the study of soil behavior and stability during earthquakes.
3. Under the auspices of Task Committees (F&H), Dr. Ronald R. Andrus, a NIST researcher in geotechnical engineering, had a successful visit to PWRI, PHRI, several universities, and private companies in December 1997. The purpose of his visit was to collect data on shear wave velocities at sites where liquefaction was observed and not observed, and to explore the use of shear wave velocities at sites for use in evaluating liquefaction potential for lifeline systems.

3. Future Plans

1. Task Committee (H) plans to hold a workshop on the Use of Centrifuge Modeling for Research into Soil Behavior and Stability During Earthquakes 28-29 September 1998, Tsukuba, Japan. It will be held just after the International Conference CENTRIFUGE '98 in Tokyo, organized by Japanese Geotechnical Society and International Society for Soil Mechanics and Geotechnical Engineering (ISSMGE).
2. Continue collaborations on liquefaction prediction based on field performance data and shear wave velocity measurements.

4. Other Activities

The Japanese Geotechnical Society has published a Handbook on Liquefaction remediation. English translation and editing of the draft was completed with the assistance of Panel members.

REPORT OF TASK COMMITTEE I

STORM SURGE AND TSUNAMIS

Date: 13 May 1998

Place: National Institute of Standards and Technology, Gaithersburg, MD, USA

Attendees:	U.S.-side –	Michael Blackford (Chairman)	NOAA
	Japan-side –	Shigetoshi Kobayashi (Acting-Chairman)	PWRC
		Keiichi Tamura	PWRI

1. Objective and Scope of Work

The objective of this Task Committee is to mitigate damage from storm surge and tsunami through cooperative research and shared technology and information. The primary cause of storm surge is considered to be tropical cyclones (hurricane, typhoons). The primary cause of tsunamis is considered to be sudden sea floor deformation due to earthquakes, volcanic activity and landslides. Both hazards may cause disasters along coastal regions.

The scope of this T/C is as follows:

1. Exchange results of research on storm surge and tsunami occurrence, generation, propagation, and coastal effects. This includes observations on historical, current, and theoretical tsunamis. Of particular interest is the effort by U.S. and Japan to acquire deep ocean tsunami measurements.
2. Exchange results and status of storm surge and tsunami mitigation activities including analysis of the problem, planning, warning and engineering approaches.
3. Exchange information on development of technologies such as computer programs to predict travel times, land-fall locations, inundation and run-up heights, and wave characteristics, improved instrumentation, and use of satellite communication for detection and warning.
4. Facilitate dissemination through exchanges of literature, technical reports at joint meetings, special workshops, joint projects, and direct interaction among participants. The storm surge research community which functions through many related societies and international organizations, defines and stimulates work in the field. The Task Committee, through its meetings and workshops, encourages exchanges of ideas and joint study by U.S. and Japanese investigators of tsunami events throughout the world.

2. Accomplishments

1. The Task Committee agreed to support the improvement of the gridded bathymetry and coastal-topography data initiated by International Tsunami Commission.
2. The Task Committee exchanged ideas on large-scale laboratory experiments on tsunami run-up.
3. Deep ocean tsunami detection systems were deployed off the coasts of Alaska and Washington by the U.S. NOAA's Pacific Marine Environmental Laboratory (PMEL) during the summer of 1997. These instruments initially functioned well, however winter storms proved it will be necessary to modify the communication system.

3. Future Plans

1. The 5th Storm Surge and Tsunami Workshop will be held in Sapporo, Japan, in July 1998.
2. Modified deep ocean detection systems will be redeployed during the summer of 1998 by PMEL.

REPORT OF TASK COMMITTEE J
WIND AND EARTHQUAKE ENGINEERING
FOR TRANSPORTATION SYSTEMS

Date: 13 May 1998

Place: National Institute of Standards and Technology, Gaithersburg, MD, USA

Attendees:

U.S.-side --	Dr. Phillip Yen (Acting-Chair)	FHWA
	Dr. Daniel Abrams	MAEC
	Dr. Bogusz Bienkiewicz	CSU
	Dr. Arthur Chiu	University of Hawaii at Manoa
	Dr. Joseph Golden	NOAA
Japan-side --	Dr. Michio Okahara (Acting-Chair)	PWRI
	Dr. Hiroshi Sato	PWRI
	Dr. Jun-ichi Hoshikuma	PWRI
	Dr. Hisahiro Hiraishi	BRI

1. Objectives and Scope of Work

1. Plan, promote, and foster research on the behavior of highway bridges when subjected to wind and seismic forces, and
2. Disseminate research results and provide specifications and guidelines based on the Task Committee's findings. Surface transportation systems play a vital role in the movement of goods and people. Highway bridges are especially influenced by the forces of wind and earthquakes because of their open exposure to those forces.

The scope of work includes:

1. Researches on highway bridges without limitation on their size and function.
2. Investigations existing and new bridge designs.
3. The behavior of whole bridge systems and/or single components of a bridge.

2. Accomplishments

The 13th U.S.-Japan Bridge Engineering Workshop was held during 2-3 October 1997, in Tsukuba, Japan. The workshop was attended by 19 U.S. and 58 Japanese participants. The proceedings of the workshop has been published and will be distributed.

3. Future Plans

1. The 14th U.S.-Japan Bridge Engineering Workshop will be held during the Fall of 1998, in Pittsburgh, Pennsylvania, USA.
2. Continue to investigate and exchange technical information on improved seismic retrofit and strengthening procedures for highway bridges based on experimental, analytical, and field studies. This exchange should include information on maintenance of existing bridges.
3. Continue to conduct cooperative research on the seismic performance of bridge piers and columns experimentally and analytically, and encourage research on seismic isolation and hybrid control of bridges.
4. Continue the coordinated research study to compare the seismic design criteria for bridges in Japan and the U. S. and discuss the method and analysis procedures for bridge column design. Continue to exchange information on the application of the limit state design method.
5. Encourage a research study on seismic, aeroelastic, and aerodynamic response of long span bridges such as cable-supported bridges with emphasis on behavior of composite materials, cable inspection, vibration control, and corrosion protection.
6. Encourage a coordinated research study on seismic response and control, system identification techniques, nondestructive evaluation of bridge structures, use and performance of structural materials including new materials, and performance of jointless bridges.
7. Dr. Jun-ichi Hoshikuma, Research Engineer of Earthquake Engineering Division, PWRI started his one-year guest research assignment on seismic design of bridges at UCSD from March, 1998.

REPORT OF TASK COMMITTEE K
WIND AND EARTHQUAKE ENGINEERING FOR OFFSHORE
AND COASTAL FACILITIES

Date: 13 May 1998

Place: National Institute of Standards and Technology, Gaithersburg, MD, USA

Attendees:	U.S.-side –	Charles Smith (Chairman)	MMS
		Martin Eskijian	CSLC
	Japan-side –	Susumu Iai (Acting-Chairman)	PHRI
		Akiyoshi Mukai	BRI

1. Objective and Scope of Work

To develop technical insights necessary to mitigate damage to offshore and coastal facilities due to extreme wind and seismic effects. The Task Committee will plan, promote and develop research initiatives to meet this objective and will disseminate the results of their research for incorporation into future specification or design guidelines. Criteria for the design of offshore and coastal facilities may differ greatly from their onshore counterparts. These differences can arise due to their unique design or mass distribution, to the fluid/structure or wind/structure interaction, to the placement of foundation elements in or on soft, fully saturated soils that can be subject to large hydrodynamic pressures, and to the lack of specific environmental data or engineering experience that has been developed for most onshore sites.

The scope of work includes:

1. Sponsoring and conducting workshops and meetings to identify key areas of research, opportunities for cooperation, and the exchange of knowledge.
2. Predicting strong ground motions for offshore and coastal sites including assessing the effects of basin geometry, linear, and nonlinear local geological effects using actual seafloor response measurements.
3. Determining the dynamic response and the interaction of structure/foundation/soil systems to seabed motions and/or extreme wind forces.
4. Assessing the dynamic response and behavior of various operational facilities mounted on offshore and coastal structures.
5. Developing assessment methodologies for earthquakes and other characteristics of potential seismic sources (e.g. faults) for offshore and coastal sites in regards to how these conditions relate to structural design criteria.

6. Promoting the implementation of new research results into current design and construction processes.
7. Developing research efforts to include laboratory and field programs to obtain data on the response of offshore and coastal facilities to extreme wind and seismic forces.
8. Creating performance standards, design specifications, guidelines, and code recommendations for applications to new construction as well as remedial action for existing facilities.

2. Accomplishments

1. Members of Task Committee (K) helped to organize and participated in the workshop, "Earthquake Criteria Workshop- Recent Development in Seismic Hazard and Risk Assessment for Port, Harbor, and Offshore Structures," held concurrently with the International Offshore Mechanics and Arctic Engineering (OMAE 1997) Conference in Yokohama, Japan on April 17, 1997.
2. Task Committee (K) held initial planning phase to conduct a third international workshop. The theme of this workshop will focus on seismic, wind, and hazard mitigation techniques for offshore and coastal facilities. It is to be held in Japan in late 1999 or early 2000.

3. Future Plans

1. Develop workshop agenda of the third U.S.-Japan Workshop on Wind and Earthquake Engineering for Offshore and Coastal Facilities.
2. Coordinate, where possible, on-going research on wind and earthquake engineering for offshore and coastal facilities of interest to the members of the Task Committee. This includes sharing of research reports and publications where possible.
3. Since tsunamis have been less severe in the U.S. than in Japan, the U.S. has fewer researchers in this specialty. The Task Committee, through its meetings and workshops, encourages exchanges of ideas and joint study by U.S. and Japanese investigators of tsunami events throughout the world.
4. Task Committee (K) will work within the framework of the U.S.-Japan Common Agenda Program focusing on the issue of acceptable seismic risk guidelines for ports and harbors.
5. Task Committee (K) will coordinate activities with the Pacific Earthquake Engineering Research (PEER) Program on ports and harbors centered at the University of Southern California.

REPORT OF NEW TASK COMMITTEE SEISMIC INFORMATION SYSTEMS

Date: 13 May 1998

Place: National Institute of Standards and Technology, Gaithersburg, MD, USA

Attendees:	U.S.-side --	Dr. Stuart Nishenko (Co-chairman)	FEMA
		Dr. William Roper (Co-chairman)	USACE
		Dr. Roger Borchardt	USGS
		Dr. Mehmet Celebi	USGS
		Dr. Josephine Malilay	CDC
		Mr. Noel Raufaste	NIST
		Japan-side --	Mr. Takaharu Kiriya (Co-chairman)
Dr. Hideki Sugita (Co-chairman)	PWRI		
Mr. Takao Masui	NLA		
Dr. Makoto Watabe	Keio University		
Mr. Keiichi Ohtani	NIED		
Dr. Keiko Ogawa	Tohoku University		

1. Objective and Scope of Work

The objective of this Task Committee is to improve understanding of earthquakes and their societal impacts using seismic information systems (SIS), loss estimation methodologies and computational models that describe the effects of seismic loading on the built environment. The Task Committee will foster cooperation between the US and Japan policy and research community. It will be a principal Panel technical resource to the Earthquake Policy Cooperation under the US-Japan Common Agenda.

The Task Committee will serve as a forum for exchanging information between the two nations on identifying, developing, and reviewing data, systems, and methodologies involved in SIS, earthquake loss estimation, geospatial and topographic information systems, real-time seismic warning systems, and their application to earthquake disaster mitigation, preparedness, emergency response, and recovery. The Task Committee also will review various disaster information networks like the Global Disaster Information Network (GDIN) and assess their applicability.

The scope of work for this Task Committee is as follows:

- A. Plan and conduct T/C workshops and joint meetings to identify research topics and develop joint research programs.
- B. Review the principles, objectives, structure and uses of existing SIS systems, loss estimation methodologies and real-time earthquake warning systems.

- C. Review existing Geographic Information Systems (GIS), identify data structures and operations required for successful integration into SIS. Results of this review may identify applications to other natural disaster phenomena such as wind, storm surge, tsunami, and flooding. If applicable, additional modules will be addressed in the future to be incorporated into the system.
- D. Facilitate the exchange of policy and research personnel, technical information, and data.
- E. Assist in the coordination of policy initiatives and research projects in the US and Japan to minimize duplication and maximize the benefits of bringing together government, academic, and private sector participants in these efforts.
- F. Facilitate the publication and distribution of earthquake policy and research results related to SIS and the implementation of these findings in guidelines, codes, and standards
- G. Provide technical assistance, consultation, and coordination of the Panel's affiliated research organizations to support related work identified by the Common Agenda's Earthquake Policy High Level Forum.
- H. Facilitate the exchange of information between U S and Japan policy makers to promote the application of SIS.
- I. Develop promotional and demonstrative activities to stimulate public awareness and interest in these emerging technologies.
- J. Disseminate the knowledge gained from this US-Japan cooperation to other nations.
- K. This Task Committee will cooperate with the UJNR Panels on Earthquake Research and on Fire Research and Safety to identify specific tasks of mutual interest.
- L. L. This Task Committee will promote and exchange new developments in real-time data acquisition, processing, and notification in conjunction with T/C (A).

2. Meeting Accomplishments

- A. Tasks concerned with the establishment of this Task Committee have been completed, including definition of the committee objectives and scope of work, establishment of the initial membership, and development of future plans.
- B. Committee Membership is proposed for government participants and candidate non-government participants are indicated.

Government Membership

U.S.-side --	Dr. Stuart Nishenko (Co-chairman)	FEMA
	Dr. William Roper (Co-chairman)	CORPS
	Dr. Harley Benz	USGS
	Dr. Roger Borchardt	USGS

	Dr. Mehmet Celebi	USGS
	Dr. William Ellsworth	USGS
	Mr. Richard Eisner	State of California, OES
	Dr. Walter Hays	USGS
	Dr. H. S. Lew	NIST
	Dr. Peter Ward	USGS
Japan-side --	Mr. Kazuo Okayama (Co-chairman)	NLA
	Dr. Hideki Sugita (Co-chairman)	PWRI
	Mr. Akira Kinoshita	GSI
	Mr. Hiroshi Masaharu	GSI
	Mr. Akira Nagai	JMA
	Mr. A. Ito	MRI
	Dr. Hiroyuki Yamanouchi	BRI
	Mr. Tomofumi Nozaki	PWRI
	Mr. Toshiaki Yokoi	BRI
	Dr. Izuru Okawa	BRI
	Mr. Atsushi Nozu	PHRI
	Dr. Keiichi Ohtani	NIED
<u>Proposed Non-Government Membership</u>		
U.S.-side --	Dr. Scott Lawson	RMS
	Dr. James Goltz	Caltech
	Mr. Ron Eguchi	EQE
	Dr. David Simpson	IRIS
	Dr. Tim Ahern	IRIS
Japan-side --	Mr. Yoshiyuki Murayama	Tohoku University
	Dr. Keiko Ogawa	Tohoku University

3. Future Plans

Plan and hold a joint workshop. The proposed time of the workshop is summer to autumn of 1999. Further discussions on the time, theme, location of the workshop will take place over the next several months. This workshop would review national policies and programs on earthquakes, use of real-time warning and notification systems, use of remote sensing and geospatial sensors and analysis technology applications, use of real-time and near-real time strong motion measurement, damage assessment and emergency response systems, use of earthquake loss-estimation methodologies and emergency response models.

- A. Review current real-time and near real-time earthquake warning/notification systems in the US and Japan, e.g.
 - CUBE/TriNet in Southern California (USGS, CDMG, Caltech)

- REDI in Northern California (UC, Berkeley)
 - SCIGN (USGS, SCEC)
 - GDIN (US govt.)
 - MOC-Net (MOC)
 - JMA net (JMA)
- B. Review real time and near real-time earthquake strong motion measurement, damage assessment and emergency response systems in the US and Japan, e.g.
- Health Impact Surveillance System for Natural Disasters (ARC-CDC)
 - California Strong Motion Instrumentation Program (CDMG)
 - US National Strong Motion Program (USGS)
 - GPS-LPS (USGS)
 - Kyoshin net (NIED)
 - SIGNAL (Tokyo Gas)
 - SATURN (PWRI)
 - UrEDAS (JR)
- C. Review earthquake loss estimation methodologies and emergency response models, e.g.
- HAZUS (FEMA)
 - EPEDAT (EQE)
 - Early Estimation System (NLA)
 - Loss Estimation Model
 - Fire and Disaster Management Agency model (FDMA)
 - Local government models